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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/834,639	04/16/2001	Kenichiro Sato	Q63941	3676

7590 10/18/2002
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EXAMINER	
CLARKE, YVETTE M	
ART UNIT	PAPER NUMBER
1752	

DATE MAILED: 10/18/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/834,639

Applicant(s)

SATO ET AL.

Examiner

Yvette M. Clarke

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 April 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 1-3, 7-12 and 16-18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 4-6 and 13-15 is/are rejected.
- 7) ☒ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

This is written in reference to application number 09/834639 filed on April 16, 2001.

Priority

- I. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The Information Disclosure Statement filed on April 16, 2001 has been entered and fully considered.

Election/Restrictions

3. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-3 and 10-12, drawn to a positive photoresist composition comprising a resin containing a repeating unit of general formula (I) and a repeating unit of formula (II), classified in class 430, subclass 270.1.
 - II. Claims 4-6 and 13-15, drawn to a positive photoresist composition comprising a resin containing a repeating unit of formula (I); a repeating unit of formula (NII) and a repeating unit having a group represented by any of the general formulae (I-1) to (I-4), classified in class 430, subclass 270.1.
 - III. Claims 7-9 and 16-18, drawn to a positive photoresist composition comprising a resin containing a repeating unit of formula (I); a repeating unit of formula (NII) and a repeating unit (I'), classified in class 430, subclass 270.1.
4. Although all three groups are classified in 430/270.1, the structures for each of the claimed polymers are sufficiently different to necessitate different automated searches. For

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example, group I requires the use of formula II while group II requires the use of formula NII. Formula II is an acrylate type compound, which has a lactone type substituent. Formula NII is also an acrylate type compound but does not contain a lactone substituent. A search for formula II would not encompass formula NII. Also, the difference between (I-1) to (I-4) and I' are in the structure of the lactone substituent. A search for a compound having groups of (I-1) to (I-4) would not encompass a structure having the formula I'. Therefore the groups are mutually exclusive.

5. The inventions are distinct, each from the other because of the following reasons:

6. Inventions I, II and III are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different modes of operation, different functions, or different effects (MPEP § 806.04, MPEP § 808.01). In the instant case the different inventions are three positive photoresist compositions, which comprise a resin containing various repeating units. Group I requires the resin to have repeating units of general formula I and general formula II. Group II requires the resin to be a terpolymer having repeating units of general formula I, general formula NII and a repeating unit having a group represented by any of the general formulae (I-1) to (I-4). Group III requires a resin to have repeating units of general formula I, general formula NII and general formula I'. As noted above the groups are mutually exclusive. Additionally, it is noted that each of A, A1 and A2 are described separately in the specification and the groups discussed do not overlap in scope.

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7. Because these inventions are distinct for the reasons given above and the search required for each of the group is different, as discussed above, restriction for examination purposes as indicated is proper.

8. During a telephone conversation with Mark Boland on August 14, 2002 a provisional election was made with traverse to prosecute the invention of group II, claims 4-6 and 13-15. Affirmation of this election must be made by applicant in replying to this Office action.

Claims 1-3, 7-12 and 16-18 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

9. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 103

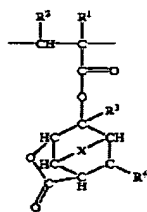
10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 4-6 and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hasegawa et al. (US 6280898 B1). Hasegawa teaches a lactone containing polymer, which is used as a base resin to formulate a resist composition having high sensitivity, resolution and

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etching resistance. The second aspect of the taught invention provides for a polymer comprising units of general formula (1a) and having a weight average molecular weight of

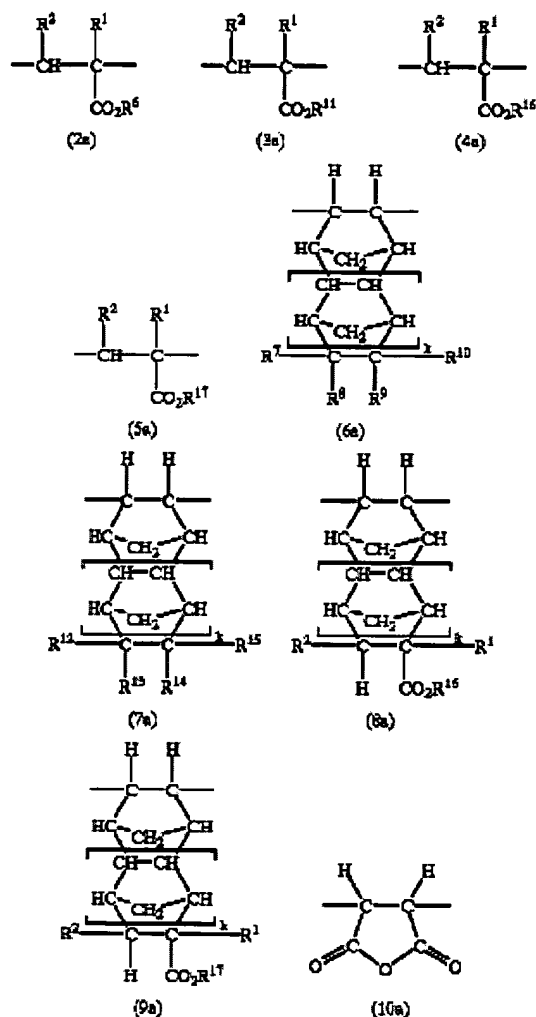


1,000 to 500,000

(1a) wherein R1 is a hydrogen, methyl or CH₂CO₂R₅; R2

is hydrogen, methyl or CO₂R₅; R3 is a straight, branched or cyclic alkyl group having 1-8 carbon atoms; R4 is hydrogen or CO₂R₅; R5 is a straight, branched or cyclic alkyl group having 1-15 carbon atoms; X is CH₂, CH₂CH₂, O or S [c. 2, l. 17-65]. The polymer may further include units of at least one of general formulae (2a) to (10a).

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(c. 2, l. 66-c. 4, l. 10). In preparing the polymer of

the invention, the proportions of the respective monomers are properly adjusted so as to produce a polymer, which will exert the desired performance when formulated as a resist composition. If desired the polymer can be prepared by copolymerizing (i) the first monomer of formula (1) with (ii) at least one second monomer of formula (2a) to (10a) and further with (iii) a third monomer having a carbon-to-carbon double bond. Examples include methyl methacrylate, maleic acid, norbornene and itaconic anhydride (c. 14, l. 40-60). Preferably the monomer contains 1-70 mol% of formula (1); 1-95 mol% of at least one of formula (2) to (10) and 0-70 mol% of the third monomer. The polymers of the invention have a weight

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average molecular weight of about 1,000 to 500,000 (c. 14, l. 61-c. 15, l. 12). It is the examiner's position that general formula (1) meets the limitations of a group having claimed formula (I-1) to (I-4); taught formula 10 meets the limitation of claimed formula (NIII) of instant claims 5; and formula (2-5) meet the limitation of claimed formula (NII).

Furthermore, when the taught third monomer is norbornene the limitations of claimed formula (I) are met.

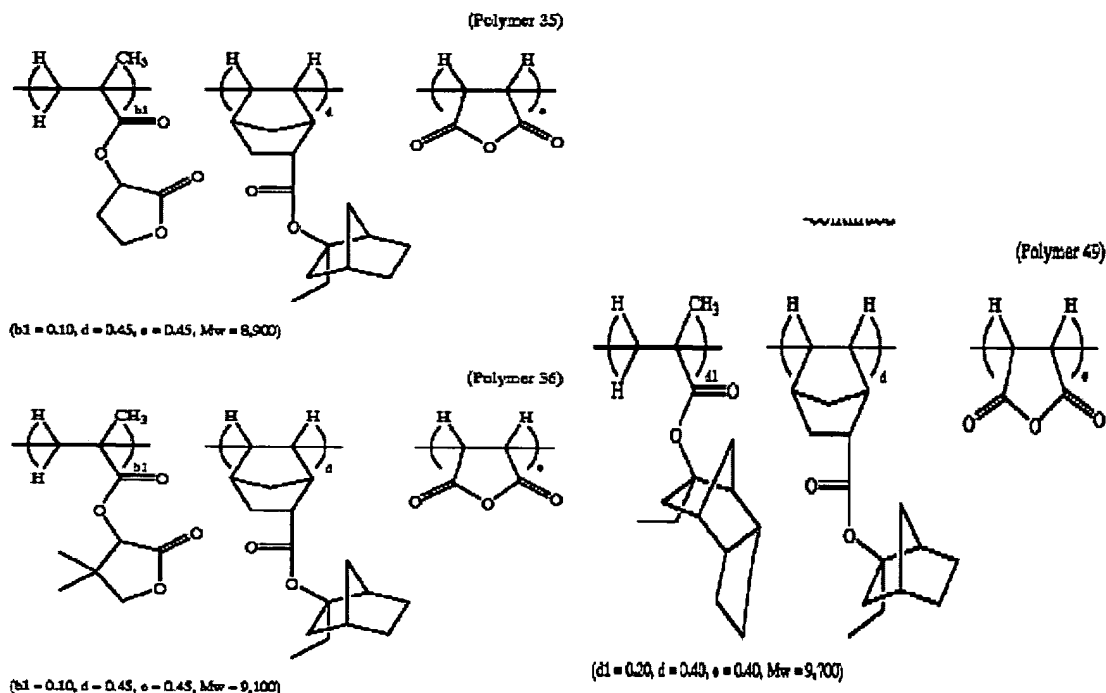
The taught resist composition comprises the said polymer as the base resin, an acid generator and a solvent (c. 15, l. 42-49). A basic compound may be blended into the taught composition to suppress the rate of diffusion of the acid generated by the photoacid generator within the resist film (c. 26, l. 56-c. 27, l. 8). The basic compound is formulated in an amount of about 0.001 to 10 parts per part of the photoacid generator (c. 29, l. 41-45). The resist composition may also include, as an optional ingredient, a surfactant, which is commonly used for improving the coating characteristics. Examples include FLORADE FC-430 and FC-431, SURFLON S-141, and MEGAFACE F-8151, which are fluorine-type and silicon-type surfactants (c. 35, l. 1-18).

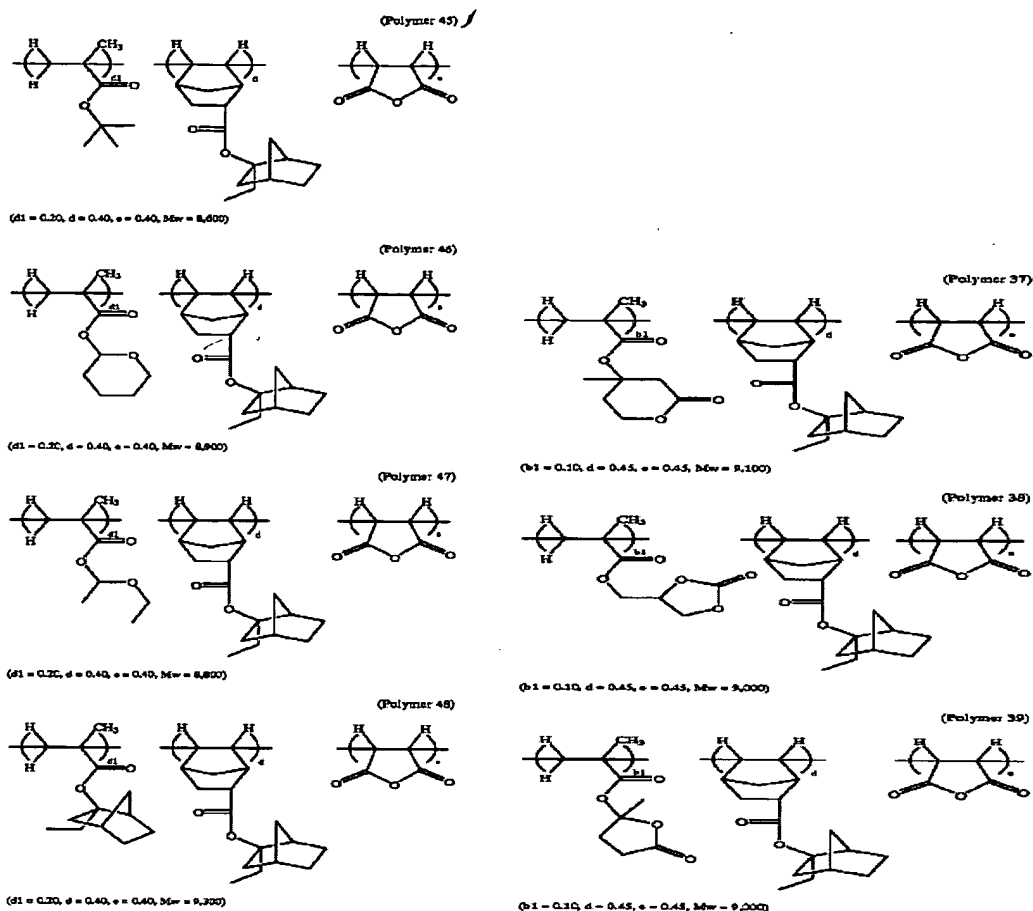
Hasegawa fails to exemplify a polymer of the instant claims however, one of ordinary skill in the art would have been motivated by the teachings of the prior art to form a polymer comprising a polymer having a unit of general formula (1a), a unit of any of the taught formula (2a) to (10a) and a norbornene unit (i.e., third monomer). Specifically when the polymer has units of formula 1a, (2a), (3a) or (4a), and 10a in combination with a norbornene unit, the limitations of the instant claims are met. One of ordinary skill would have been further motivated by Hasegawa to admix the said polymer with (B) a photoacid

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generator (C) a basic compound and (D) a surfactant in order to formulate a resist composition having a high sensitivity, resolution and etching resistance.

12. Claims 4-6 and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinsho et al. (US 6284429 B1) in view of Harada et al. (US 2001/0033989 A1). Kinsho exemplifies in examples (I-35) to (I-39) and (I-45) to (I-49) photoresist compositions comprising a base resin, a photoacid generator, a basic compound and a solvent (see Table 2, c. 81-82). The base resins used in the said examples are as follows:



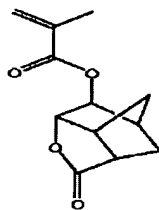


It is the examiner's position that the said resins meet the limitations of the instant claims wherein the first monomer of each of the said polymers meets the limitation of claimed formula (NII); the second monomer meets the limitations of claimed formula (I) wherein Rn3 is a substituted alkyl group; and the third monomer meets the limitations of claimed formula (NIII). Kinsho further teaches that the resist composition may also include, as an optional ingredient, a surfactant, which is commonly used for improving the coating characteristics. Examples include FLORADE FC-430 and FC-431, SURFLON S-141, and MEGAFACE F-8151, which are fluorine-type and silicon-type surfactants (c. 47, l. 31-48).

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Kinsho however fails to teach the use of a monomer having a group, which meets the limitations of claimed formula (I-1) to (I-4).

Harada teaches a resist composition comprising (A) a polymer; (B) an organic solvent; and (C) a photoacid generator. Harada teaches that recurring units of any of the formula (4) through (39) can be added to the taught resist composition in order to improve adhesion [p. 0019]. Synthesis example 2-3 exemplifies the co-polymerization of 1,1-bis (trifluoromethyl)



ethyl methacrylate with monomer 1 (1:1):

wherein monomer 1 is taught

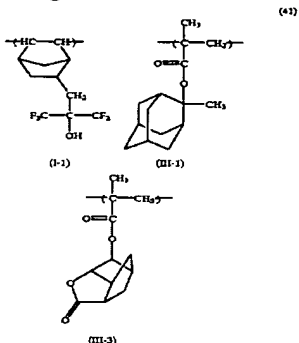
compound 27 used to improve adhesion. It is the examiner's position that taught monomer 1 meets the limitation of a repeating unit having a group represented by claimed formula (I-1). One of ordinary skill in the art would have been motivated to incorporate the preferred compound 27 (i.e., monomer 1) into the taught resin of Kinsho in order to improve adhesion of the formed composition.

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Nishimura et al. (US 2002/0009668 A1) clearly anticipates the claimed invention in synthesis example 23 (p. [0389] and [0739-0740]). However the said reference is not

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citable as prior art due to a filing date of June 14, 2001, which is later than the filing date



of the instant application.

- Hatakeyama et al. (US 2001/0038969 A1), which teaches a polymer comprising recurring units of fluorinated maleic anhydride and/or fluorinated maleimide compounds (see compounds (5-30) and (5-31)).
- Nishimura et al. (US 2002/0132181 A1) which teaches a radiation sensitive resin (see p. 0019 and formula (1)).
- Hasegawa et al. (US 2002/0061465 A1) which teaches a polymer bearing specific silicon containing group (see p. 0042 and polymer 21).
- Miyaji et al. (US 2002/0058201 A1) which teaches a radiation sensitive resin composition (see p. 0568, p. 1062-1065, synthesis ex. 24 and 25).
- Hatakeyama et al. (US 2002/0051935 A1) which teaches a resist composition and patterning process (see p. 0058, compounds 10-43).
- Hatakeyama et al. (US 2001/0018162 A1) which teaches polymer comprising recurring units of an acrylic derivative of a fluorinated backbone (see compound 1-24, p. 0025).
- Hatakeyama et al. (US 2001/0010890 A1) which teaches a polymer comprising recurring units of an acrylic derivative of a fluorinated backbone (see compound 5-32).
- Harada et al. (US 2002/0051936 A1) which teaches an acrylate resin containing fluorinated alkyl groups in ester side chains (see p. 0029, synthesis ex. 7, p. 0102-0103).
- Harada et al. (US 2002/0048724 A1) which teaches an acrylic resin containing hexafluoroisopropanol units (see p. 0035, monomer 8, synthesis ex. 7, p. 0111-0113).

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14. Any inquiry concerning this communication or earlier communications from the examiner should be directed Yvette C. Thornton whose telephone number is 703-305-0589.


The examiner can normally be reached on Monday-Thursday 8-6:30.

15. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Janet C. Baxter can be reached on 703-308-2303. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

16. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1193.

17. *****Please note that the examiner has recently changed her name from "Clarke" to "Thornton". *****

yct
October 17, 2002


JANET BAXTER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700